ASSIGNMENT 1

**What is time complexity of fun()?**

|  |  |  |
| --- | --- | --- |
| int fun(int n)  {    int count = 0;    for (int i = n; i > 0; i /= 2)       for (int j = 0; j < i; j++)          count += 1;    return count;  } | | |
| **A** | **O(n^2)** |
| **B** | **O(nLogn)** |
| **C** | **O(n)** |
| **D** | **O(nLognLogn)** |

ANSWER: C

**What is the time complexity of fun()?**

|  |  |  |
| --- | --- | --- |
| int fun(int n)  {    int count = 0;    for (int i = 0; i < n; i++)       for (int j = i; j > 0; j--)          count = count + 1;    return count;  } | | |
| **A** | **Theta (n)** |
| **B** | **Theta (n^2)** |
| **C** | **Theta (n\*Logn)** |
| **D** | **Theta (nLognLogn)** |

ANSWER:B

Let w(n) and A(n) denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. which of the following is ALWAYS TRUE? (GATE CS 2012)

(A) A(n) = \Omega(W(n))

(B) A(n) = \Theta(W(n))

(C) A(n) = O(W(n))

(D) A(n) = o(W(n))

ANSWER;C

**Which of the following is not O(n^2)?**

|  |  |
| --- | --- |
| **A** | **(15^10) \* n + 12099** |
| **B** | **n^1.98** |
| **C** | **n^3 / (sqrt(n))** |
| **D** | **(2^20) \* n** |

ANSWER:C

**Which of the given options provides the increasing order of asymptotic complexity of functions f1, f2, f3 and f4?**

**f1(n) = 2^n**

**f2(n) = n^(3/2)**

**f3(n) = nLogn**

**f4(n) = n^(Logn)**

|  |  |
| --- | --- |
| **A** | **f3, f2, f4, f1** |
| **B** | **f3, f2, f1, f4** |
| **C** | **f2, f3, f1, f4** |
| **D** | **f2, f3, f4, f1** |

ANSWER:A

**Consider the following program fragment for reversing the digits in a given integer to obtain a new integer. Let n = D1D2…Dm**

|  |
| --- |
| int n, rev;  rev = 0;  while (n > 0)  {     rev = rev\*10 + n%10;     n = n/10;  } |

**The loop invariant condition at the end of the ith iteration is: (GATE CS 2004)**

|  |  |
| --- | --- |
| **A** | **n = D1D2….Dm-i and rev = DmDm-1…Dm-i+1** |
| **B** | **n = Dm-i+1…Dm-1Dm and rev = Dm-1….D2D1** |
| **C** | **n != rev** |
| **D** | **n = D1D2….Dm and rev = DmDm-1…D2D1** |

ANSWER:A

**What is the time complexity of the below function?**

|  |  |  |
| --- | --- | --- |
| void fun(int n, int arr[])  {      int i = 0, j = 0;      for(; i < n; ++i)          while(j < n && arr[i] < arr[j])              j++;  } | | |
| **A** | **O(n)** |
| **B** | **O(n^2)** |
| **C** | **O(nlogn)** |
| **D** | **O(n(logn)^2)** |

ANSWER:A

**The following statement is valid. log(n!) = (n log n).**

|  |  |
| --- | --- |
| **A** | **True** |
| **B** | **False** |

ANSWER:A

**What does it mean when we say that an algorithm X is asymptotically more efficient than Y?**

|  |  |
| --- | --- |
| **A** | **X will be a better choice for all inputs** |
| **B** | **X will be a better choice for all inputs except small inputs** |
| **C** | **X will be a better choice for all inputs except large inputs** |
| **D** | **Y will be a better choice for small inputs** |

ANSWER:B

